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change in the relation of land and water during fifty-four years; and the mean level of the Baltic results with a probable error of  $\pm 6.1$  mm. The levellings to Constance and to Amsterdam are published, and the mean level of the North Sea is found 9.3 cm. above that of the Baltic. Computation of polar coordinates between geodetic and astronomical points. Determination of latitudes and azimuths. Maximum local deflection of the vertical reaches  $6''.1$  in the meridian, and  $12''.7$  in azimuth.

Roumania. — Astronomical determinations of positions.

Russia. — Connection of the triangulation of Bulgaria with that of Russia; astronomical determination of differences of longitude, connecting Bulgaria with Pulkowa, and Tiflis with the triangulation of the Caucasus; pendulum observations continued in the Caucasus; extension of the levels of precision (double measures) up to date, 4,123 km., and of single lines 618 km.

Saxony, Germany. — Publication of part i. of the third section of the astronomical and geodetic observations, comprising ten stations; recomputation of the base at Grossenhain.

Switzerland. — Additions to the triangulations to connect astronomically determined positions, and two new base-lines at Weinfelden (length 2.5 km.) and at Bellinzona (length 3.2 km.), both measured with the Spanish apparatus of Ibañez; mean error of measure,  $\frac{1}{3000000}$  for the Aarberg base of 1880,  $\frac{1}{3000000}$  and  $\frac{1}{3000000}$  for the other two bases respectively. The coefficient of expansion of the iron bar of this apparatus had increased during twenty years  $\frac{1}{3}$  part. After sixteen years of labor, the operations of levels of precision have been brought to a close.

Spain. — Determination of the length of the triangle side, Mulhacen-Tetica (82827.546 m.  $\pm 0.115$  m.), of the great quadrilateral connecting Spain with Algeria; adjustment of the triangulation connected with the base of Olite; junction of the Balearic Islands with the mainland, and observation of one side, of 240 km. in length (Desierto to Torrellas), during the night, by means of electric light; tidal and levelling operations; determination of the longitude between Madrid and Badajos; gravity measures at Madrid.

Wurtemberg, Germany. — Connection of lines of spirit-levellings with levels of the Black Forest.

Belgium. — Comparison of results of the adjusted triangulation.

Norway. — Results of the difference of longitude of Christiania and Bergen, and of two base-lines with probable errors of  $\frac{1}{1570000}$  and  $\frac{1}{1500000}$  of their length; adjustment of a base-connection with a primary line involving fifty-three conditional equations.

In conclusion, Yvon Villarceau presents a paper on observations made at Paris with an isochronic regulator in connection with his new method for relative measures of gravity; the apparatus, however, had not yet been brought to the desired perfection. C. A. S.

#### TRYON'S CONCHOLOGY.

*Structural and systematic conchology (etc.).* By GEORGE W. TRYON, Jun. Vol. ii. Philadelphia, the author, 1883. 430 p., 69 pl. 8°.

THE second volume of Mr. Tryon's work has appeared with commendable promptness. It contains a discussion of the Cephalopoda, Pteropoda, and the Gastropoda, beginning with the pectinibranchs, as far as and including the nudibranchs. The classification is, of course, the same as that criticised by us in the first volume, and cannot be said to improve on closer acquaintance. Some of the allocations seem particularly inadvisable. For instance: Scissurella, usually regarded as of family rank, is combined without reserve with Pleurotomaria in one family. The Bellerophonitidae are retained in full family rank; and yet they are with great probability, as suggested by Meek, only large, symmetrically rolled Emarginulas, which latter are put in a different suborder, with the true Limpets, to which they have no close relation, and divorced from the Haliotidae, which they more nearly resemble.

The order Polyplacophora is defined (p. 103) as having the "shell multivalve, consisting of eight pieces inserted upon the back of the animal, and surrounded by a mantle border;" yet with the Chitonidae are placed, to form this order, a family Neomeniidae, which, to say nothing of other differences, have no shell at all.

The order Pectinibranchiata is defined as having pectiniform branchiae in a cavity above the neck, 'having an external opening upon the side of the neck,' dioecious, and with spiral shells.

The order Scutibranchiata is described as having pectiniform branchiae in a cavity above the neck, *or at the lower edge of the mantle around the foot*, dioecious; shell spiral *or conical*, holostomate.

The portions in italics are intended to cover the Docoglossa, which do not belong with the

Scutibranchs at all, in our opinion. Excluding these, which refer only to the Docoglossa, it will be observed that the only difference (according to the definitions) between the two orders is, that the latter has a holostomate shell. Everybody knows that a large proportion of the pectinibranchs of Tryon are holostomate, that is, have an entire aperture without a canal: for instance, *Scalaria*, *Cyclostoma*, *Litorina*, etc. What, then, becomes of the two orders? As a rule, the definitions are deficient in not giving essential characters, even when the groups defined are perfectly valid, and redundant in giving characters belonging to groups of different rank from the one defined, or of no particular value.

Of small errors we have noted not a few; but it is probable that a book of this kind must be expected to have a certain number, and completeness can hardly be looked for. However, the author has brought together an immense number of genera; and the work, when the index appears, will be very useful to conchologists on this account, though it would have been more so, had each genus been given a date, since, in general, there are no references. The coloration of the plates, also, is better than in the previous volume, and the figures for their kind are fairly good. The work is well bound and on good paper, but suffers from inferior printer's ink, which 'overlays' on nearly every page.

In conclusion we may say, that, for use as a text-book for fresh students, this work would be decidedly inadvisable; but those who have already gained some knowledge of modern classification, and of the anatomy and physiology of mollusks, will find it to a certain extent useful, though by no means to a degree commensurate with the labor which has evidently been spent upon it.

#### ADAMS'S LECTURE ON EVOLUTION.

*Evolution: a summary of evidence.* A lecture delivered in Montreal, March, 1883, by ROBERT C. ADAMS. New York, *G. P. Putnam's Sons*, 1883. 44 p. 12°.

MR. ADAMS has attempted to summarize in a single lecture the various kinds of evidence that have been adduced in favor of the evolution of plants and animals, and the earth itself. The author claims to be nothing further than a compiler, and aims to present 'an abstract of many books' in 'plain language.' As he has not limited himself to any particular class of evidence, nor confined his attention to

any single object, or group of objects, it is obvious that any attempt to treat in a single lecture the wide range of subjects embraced under evolution must prove a failure. It is simply a jumble of facts, collected, for the most part, from popular books and essays, with a considerable admixture of error and misconception. A little familiarity with the more recent discussions on the subject of the origin of the vertebrates (for example, those of Dohrn and Lankester) would have led our author to very different views concerning 'the connecting links' between vertebrates and invertebrates, and saved him the trouble of rehearsing exploded ideas respecting *Amphioxus* and the ascidians. Any respectable text-book in systematic zoölogy would have told Mr. Adams that an ascidian is not a mollusk, that *Balanoglossus* is not regarded as an 'intermediate form' between mollusks and such 'jointed animals' as crustaceans and insects, and that corals are not protozoa.

The author's reference to intermediate forms and 'connecting links' shows that he has not grasped the ideas now generally received concerning the genealogical relationship of animals. One or two passages will illustrate this point. "If in twenty-one days the chick passes through the forms common to sponges, shell-fish, fish, and reptiles, does it not suggest that its race may have developed through these lower races during vast ages? If in forty weeks a single man now develops through forms common to all the lower races of animals, may not the race of man have slowly arisen through all the ranks of life below him, each great division leaving its record in the unfolding germ of the latest individual? . . . Through the sponges we find the radiates connected with the protozoans, or first forms of life, such as corals and sea-animalcules."

Under the head of 'Unity of substance' we are told that "the germs which produce men, dogs, sheep, or any of the highest class of animals, cannot be discovered to differ by any test of microscope or chemistry. . . . Each individual begins life in the lowest form of matter, and develops through forms common to all the species below it. A man has by turns the forms of the germs of plant, protozoan, mollusk, articulate, and vertebrate—fish, reptile, and mammal."

The lecture abounds in such loose and inaccurate statements as the above, and must therefore be pronounced an unsafe guide to 'the uninitiated,' to whom the lecture is especially addressed.